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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/752,637   | 12/29/2000  | Gerard J. Foschini   | 12-6                | 1484             |
| 22046  | 7590        | 06/28/2005           | EXAMINER            |                  |
| LUCENT TECHNOLOGIES INC.<br>DOCKET ADMINISTRATOR<br>101 CRAWFORDS CORNER ROAD - ROOM 3J-219<br>HOLMDEL, NJ 07733 |             |                      | BOCURE, TESFALDET   |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2631                |                  |

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/752,637

Applicant(s)

FOSCHINI ET AL.

Examiner

Tesfaldet Bocure

Art Unit

2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-12,14-19 and 21-60 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 42-60 is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6,7,9,10,14-19,21,22 and 25-41 is/are rejected.
- 7) ☐ Claim(s) 2,8,11,12,23 and 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/02.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1,3,6,7,9,10,14-19,21-22, 25, 27 -35,37 and 41 are rejected under 35 U.S.C. 102(e) as being anticipated by Popovic (US patent number 6,804,307, newly cited ).

3. Popovic teaches a space-time diversity transmission system having a transmitter (see for transmitters in figures 1,3B ) and a receiver (in fig. 1) comprising: the

Art Unit: 2631

transmitter having a time-space coder signal (200) for coding the source signal into a linear combination of the source by conjugating, inverting the sign of the source data  $X_1$  and  $X_2$ , coded and uncoded of the source data  $X_1$  and  $X_2$  (see starting col. 3, line 60 through col. 4, line 36); grouping the time-space coded signal into matrix (see and the disclosed matrixes disclosed in col. 6) ; and encoding by encoder 210 before space-time encoding (220) as in 1,9,10,16,18 and 25.

Further to claims 3-7,14-15,17,19,21,22,27,29-30 Popovic also teaches that:

Art Unit: 2631

The time-space encoder signals are derived from the source data  $X_1$  and  $X_2$  as in claim 3; the division of the source data  $X_1$  and  $X_2$  are further divided (see col. 3, lines 44-66, where the column  $n$  corresponds to the number of antennas for transmission) as in claims 4,6,7,14,15,21,22 and 30; encoded source signal into a linear combination of the source by conjugating and inverting the sign of the source data  $X_1$  and  $X_2$  as in claim 29; the space-time encoded signals are spreaded as in claim 19 (see fig. 4B); and transmitting the diversity signal using an RF signal (see output signal from the antennas 202-205 , as in claims 17 and 27.

Further to claims 31-35,37 and 41 Popovic also teaches that: the received signals are reconstructed and sampled by the decoder in figure 1 and as disclosed in col. Col. 4, lines 16-36 for driving the transmitted signal  $X_1$  and  $X_2$  as in claim 31-35,37 and 41.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 26 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Popovic (US patent number 6,804,307, newly cited ).

6. Popovic teaches a space-time diversity transmission system having a transmitter (see for transmitters in figures 1,3B ) and a receiver (in fig. 1) comprising: the

Art Unit: 2631

transmitter having a time-space coder signal (200) for coding the encoded source signal into a linear combination of the source by conjugating, inverting the sign of the source data  $X_1$  and  $X_2$ , coded and uncoded of the source data  $X_1$  and  $X_2$  (see starting col. 3, line 60 through col. 4, line 36); grouping the time-space coded signal into matrix (see and the disclosed matrixes disclosed in col. 6) ; and encoding by encoder 210 before space-time encoding (220) as in claim 25.

Further Popovic also teaches that the space-time signal having a 4X4 metrics and 8X8 metrics disclosed in col. 6 are driven from linear combination of the source by conjugating, inverting the sign of the source data  $X_1$  and  $X_2$ , coded and uncoded of the source data  $X_1$  and  $X_2$  to maintain an autocorrelation property of zero. However he fail to teach that the 4x4 matrix as claimed in claim 26.

Therefore, it would have been obvious to one of an ordinary skill in the art to use the 4X4 or 8X8 metrics of Popovic and generate a perfect orthogonal signal to be transmitted and be able to detect the source information at the time the invention was made.

Even though and the decoder in fig. 1 does not show as using a mean square error detection as in claim 40 (see page 11, lines 19-24), such a mean square error detection to detect the transmitted source data source data  $X_1$  and  $X_2$  is notoriously known and Examiner is taking an official notice.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 36, 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Popovic (US patent number 6,804,307, newly cited ) in view of Dabak et al. (US patent 6,775,260, of record).

9. Popovic teaches a space-time diversity transmission system having a transmitter (see for transmitters in figures 1,3B ) and a receiver (in fig. 1) comprising: the transmitter having a time-space coder signal (200) for coding the encoded source signal into a linear combination of the source by conjugating, inverting the sign of the source data  $X_1$  and  $X_2$ , coded and uncoded of the source data  $X_1$  and  $X_2$  (se starting col. 3, line 60 through col. 4, line 36); grouping the time-space coded signal into matrix (see and the disclosed matrixes disclosed in col. 6) ; and encoding by encoder 210 before space-time encoding (220) as in claim 31.

Further Popovic also teaches that the transmission system in fig. 4B can be used in a CDMA (claimed spread spectrum) environment, where the transmitter transmits a spread spectrum signal and receiver 440 receives the transmitted spread spectrum signal. However he fails to teach that the received signal at the receiver are despreaded, match filtered and decorrelated as in claims 36, 38 and 39 respectively.

Art Unit: 2631

Dabak for the same endeavor as the instant application and that of Calderbank teaches a transmission system (figs 2, 6A,7) having a transmitter and receiver, wherein the transmitter for transmitting a space-time encoder diversity signal having means for spreading the encoded signal (see element 208 in fig.2). The receiver comprising a matched filter for despreading and decorrelating the received signal (600-604) the received spread spectrum signals as in claims 36, 38 and 39.

Therefore, it would have been obvious to one of an ordinary skill in the art to apply a spread spectrum transmission method in the system of Calderbank in order to transmit the space-time encoded and spreaded signal for a secure transmission at the time the invention was made.

### ***Allowable Subject Matter***

10. Claims 42-60 are allowed.
11. Claims 2,8,11,12,23 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Reasons for Allowance***

12. The following is a statement of reasons for the indication of allowable subject matter: The claimed subject matter in claims 42-60 is allowable because the arts of record fail to teach the claimed "an apparatus for use in processing received signals that were transmitted via four transmit elements of a transmitter, said transmitter being



Art Unit: 2631

adapted to transmit a source bit stream by dividing said source bit stream into L data sub streams,  $L > 2$  and grouping derivatives of symbols derived from each of said data substreams to form four transmit time sequences, one sequence for each transmit element, each of said time sequences spanning f symbol periods, at least one of said derivatives of said symbols being a complex conjugate of one of said symbols, said apparatus comprising: ***a matrix multiplier (207 in fig.2) for supplying as an output matched filtered signals which are versions of preprocessed signals derived from a received signal which includes versions of said time sequences which have been combined by the channel between said transmit elements and said receiver*** ; and ***a baseband signal processing unit (209) receiving said matched filtered signals as an input and developing therefrom reconstructed versions of said symbols derived from each of said data substreams.***

13. The subject matter in claims 2,8,11,12,23 and 24 are allowable because the arts of record fail to teach the claimed matrix for transmission in each antenna.

### ***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

Art Unit: 2631

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patent numbers and application 2001/0017903, 2002/0122383, 2002/0172293, 2002/0102950, 6,661,856, and 6,137,411 issued to Naguib et al., Wu et al., Kurchi et al., Gore et al., Calderbank et al., Wqhinnett et al. respectively and PCT publication number WO 01/50671 issued to Ionescu disclose a transmission system for transmitting and receiver a space-time encoded signals.

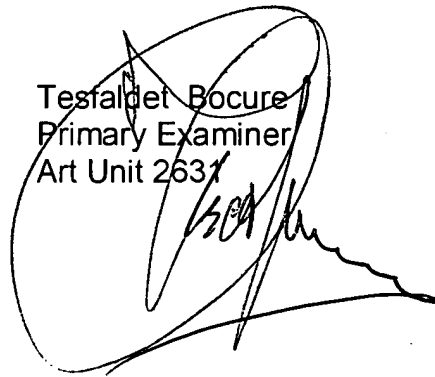
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tesfaldet Bocure whose telephone number is (571) 272-3015. The examiner can normally be reached on Mon-Thur (7:30a-5:00p) & Mon.-Fri (7:30a-5:00p).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2631

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tesfaldet Bocure  
Primary Examiner  
Art Unit 2631

A large, stylized handwritten signature in black ink, likely belonging to Tesfaldet Bocure, is written over the printed name and title.

T.Bocure